

Creating a Data-driven Organization

Photon's Best Practices

A #ThinkBeyond Best Practice Series

PHOTON®

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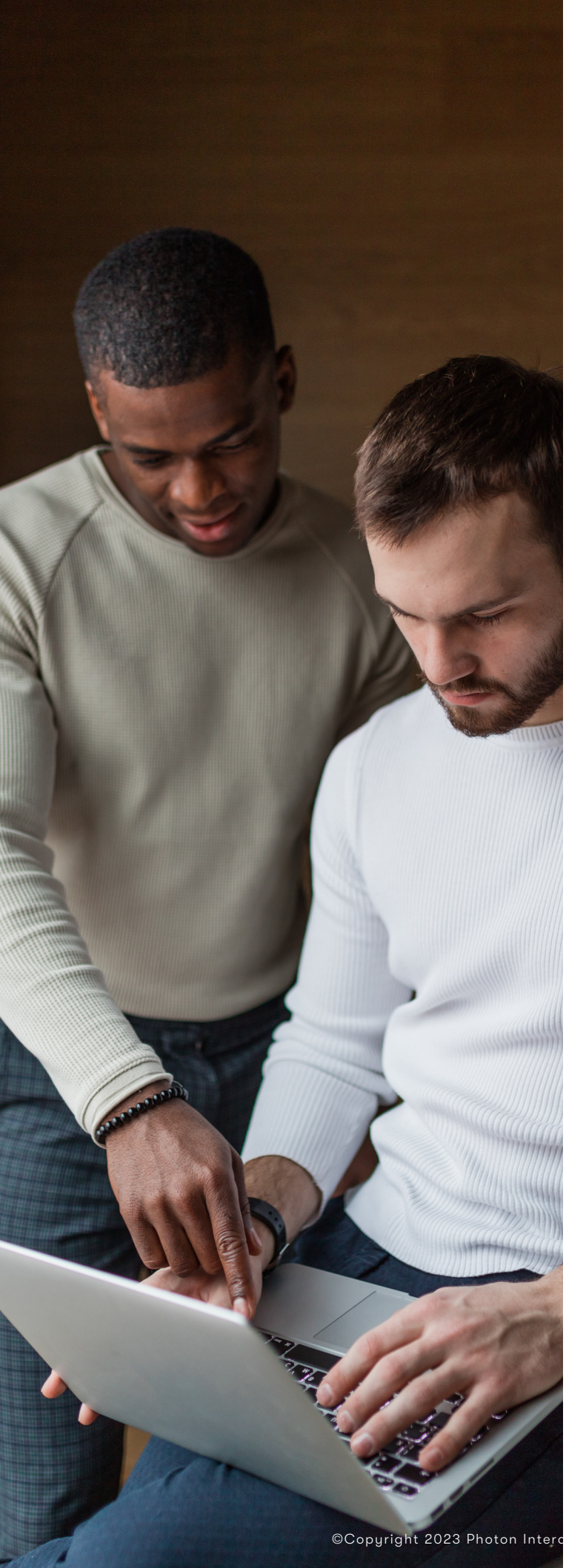


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Executive summary

The adoption of big data and analytics has shown a lot of promise across various industries—right from retail to financial services and healthcare to travel—as it enables businesses to gain critical business insights and foster growth. With technologies like cloud and artificial intelligence enabling advanced analytics, the big data market is witnessing rapid growth and is likely to reach a valuation of more than $118.5 billion by 2022.[1] The business value and competitive advantage that big data and analytics afford is undeniable.

Becoming data-driven is paramount for enterprise growth and success and requires traditional companies to change their corporate structure, bringing themselves closer to the operating models of digital disruptors threatening their businesses. The pivot to digital transformation, regulations around data privacy, and the need for greater levels of data quality are compelling enterprises to create competencies around how data is managed, transformed, cleansed, stored, analyzed, and consumed across businesses.

To keep pace with new digital business and technology challenges, organizations need effective operating models built with a strong data and analytics platform. Gartner predicts by 2020, 80% of organizations will initiate deliberate competency development in data literacy, acknowledging their extreme deficiency.[2]

This stresses the need for CDOs, CIOs, digital leaders, and decision-makers to be at the forefront of digital change, close gaps in competencies, and transform their enterprise into a data-driven organization. A truly data-driven organization maximizes business value by using data as the basis for critical decision-making through high-quality analytics.

This guide deep dives into Photon's best practices in building a data-driven organization. It discusses the key challenges that companies face in their journey to transform into data-driven organizations, and it highlights how Fortune 500 companies are implementing robust data analytics strategies to achieve key business goals.

A brief history of **data in organizations**

Generation 1: Digitization of enterprise data (Timeframe: 1980s to early 2000s)

- Digitization became crucial for dealing with analog information.
- With the advances in data warehousing, the 1990s saw the emergence of data mining which helped discover patterns in large data sets. Businesses had begun to leverage historical data to predict customer needs.
- The rapid increase in public Internet usage led to the evolution of data—in terms of variety, volume, and velocity—which in turn created the need for quicker access and analysis of data.
- In 2005, large amounts of data were called "big data," and these were nearly impossible to analyze. Hadoop was developed in the same year.
- The growth of big data led to the emergence of new open source technologies like Apache Spark and Apache Cassandra. The cloud came to the fore and delivered the processing power required to handle and analyze these systems of records.

Generation 2: Data analytics as a post facto reporting method (Timeframe: Early 2000s to 2010)

- The mid-2000s saw the rapid rise of trends like mobile, eCommerce, and social media, which resulted in a "data explosion," impacting most industries.
- In 2002, Capital One hired the first-ever Chief Data Officer.
- Data-driven enterprises started focusing on data access, data collection, reporting, and alerting.

Generation 3: Data-driven organizations (Timeframe: 2010 to present)

- Data-driven practices are accepted at the C-Level. Stakeholders start providing the business case highlighting the tangible benefits of leveraging data.
- The management understands the difference between traditional analytics (business intelligence and reporting) and advanced analytics (predictive and prescriptive tools that incorporate machine learning).
- The management is sold on the value that a data-driven organization brings. The organization defines its three core elements: People, Process, and Technology.
  - **People:** Multi-disciplinary, agile teams that combine business operations, IT experts, data scientists, and data architects.
  - **Process:** An agile approach for rapid iterative launch cycles. Breaks solutions into modular chunks to be deployed incrementally as opposed to going with large, full solution deployments that involve great execution risks and might delay value creation.
  - **Technology:** An agile technology approach that caters to changing business objectives and consumer requirements.

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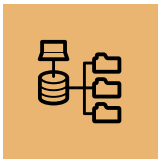
Challenges in building a **data-driven organization**

Although most companies today agree that big data and analytics have boundless potential, obstacles such as acceptance at the leadership level, cultural and role changes, and data risks often hinder companies from fully committing to a data-driven mindset. We discuss some of these key challenges below.



Data and privacy regulations

Incidents of data theft, breach of privacy, market manipulation, etc. have dominated the news for quite some time. Data-driven organizations need to possess deep knowledge and expertise around regulations like GDPR for avoiding steep fines or even losing their license to operate.



Data silos

Analyzing structured and unstructured data in silos can result in an unintelligible view of data, inconsistencies in data, waste of resources, and poor productivity. Enterprises must employ the right tools and techniques to streamline all the data, create a collaborative culture, and better leverage data to meet business goals.



Data integrity

Most enterprises have enough data they can analyze to improve their decision-making. However, they fail to do so effectively due to poorly managed data. It is crucial to create competencies around data management and governance to analyze the right data and derive actionable business insights

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Skill sets

In the era of AI-powered advanced analytics, acquiring the technical know-how to leverage big data can be difficult. Enterprises need to develop in-house expertise or seek consulting, support, and training from reputed big data and analytics service providers to execute their data strategy successfully.

Technology integration

As digital disruption compels enterprises to adopt and drive new technologies, the integration of components with various interfaces becomes a challenge. Enterprises must understand how their existing resources operate and assess their compatibility with future IT investments.

"New approaches to data analysis must be explored to remain competitive. It enhances the need to consume data and develop deep insights like predictive consumer behavior and vivid buyer personas."



Mukund Balasubramanian,
CTO at Photon

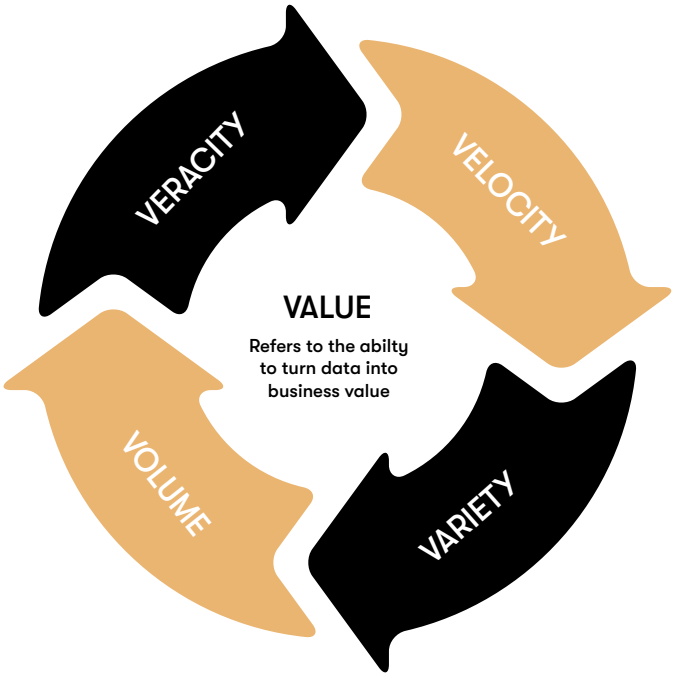


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Best practices in becoming **data-driven**

Grounding: The 5 V's of big data

There will be an estimated 40 trillion gigabytes of data by 2020.[3] As data continues to grow and evolve at an unbelievable rate, it is important to better understand big data through its five primary characteristics.



Velocity: Refers to the speed at which enormous amounts of data are collected, generated, and analyzed. Every day, data volume is on the rise as the number of touchpoints and content types continues to grow. This drives the speed of data transmission, creating the need to access all the relevant data and allow for real-time analysis.

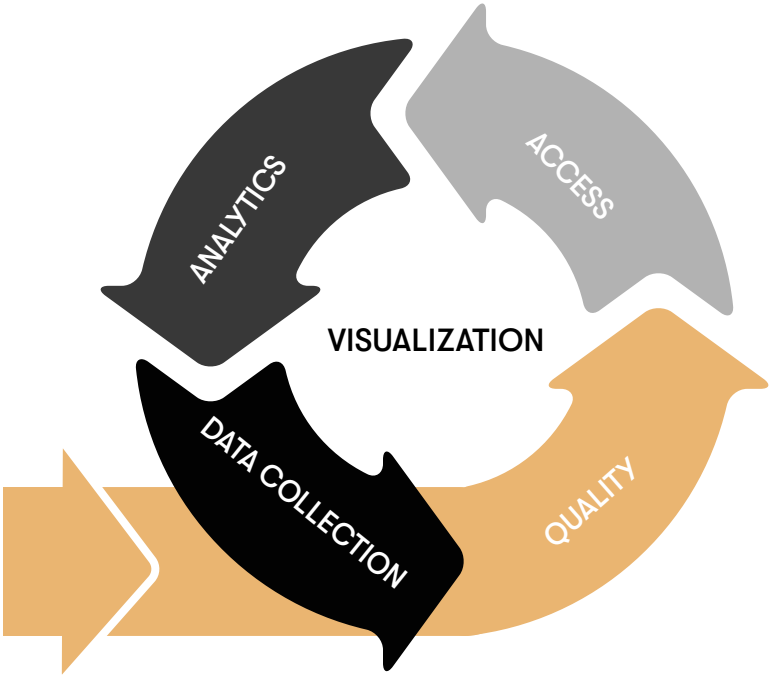
Volume: Massive amounts of data are generated each second from smartphones, web browsing, social media, videos, etc. Traditional processing methods will not suffice. Advanced tools and technologies are required to store and analyze the data.

Variety: Refers to structured, unstructured, and semi-structured data collected from multiple sources. In the past, data collection was only from spreadsheets and databases, but today data comes in an array of forms - emails, PDFs, videos, photos, social media posts, and many more.

Veracity: Defines the quality or trustworthiness of the data. Processing large amounts of data is of no use if the quality of data is not reliable. 95% of organizations will see negative impacts from poor data quality.[4] Trusted information enables businesses to accelerate digital innovation, make informed decisions, and gain a competitive advantage.

Value: Ability to turn data into real business value to unlock new digital capabilities.

Foundation: Data collection, quality, access, analytics, and visualization



Data access rights (DAR)

A permission to allow a person or software to locate and read digital information at rest. DAR plays an important role in information security and compliance. For example, as per GDPR, a data subject has the right to access their personal data and request a correction or erasure.

Data analytics

The process of analyzing data sets to draw valuable insights with the help of specialized systems and software.

Data collection

Varies between real-time event based collection mechanisms and large scale batch transfers.

Data visualization

The visual representation of information from the data with the use of elements like charts, graphs, and maps. Data visualization tools help in identifying trends, outliers, and patterns in data.

Data quality assurance

The process of discovering inconsistencies and anomalies in the data and carrying out data cleaning (e.g. removing outliers, missing data interpolation) to improve data quality.

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Data transparency: Fighting the hoarding of data

From data hoarding habits to data-driven practices:

Data hoarding habits	Business impact
Unclassified data	Unhealthy storage environment with data leads to a lack of visibility over its age, ownership, or location. The data has gone stale or could be deleted.
Storage infrastructure	Dealing with bad data negatively impacts business value. Organizations incur a loss of $15 million per year on average because of poor data quality.[5]
Exponential growth data curve	Continued acceleration of user engagement across an ever-expanding digital landscape combined with new varieties of data has compounded a growth in data collection.
Motivation to protect	A hoarding culture can enable data owners to hide or protect the data they are collecting. This leads to exposure to compliance issues or loss of business value.

Data-driven practices	Business impact
Behavior changes	Educate employees about the costs and explain the impact on the business. This helps employees appreciate the value of data, paving the way for better data management.
Visibility and classification	Review all stored data. Identify business critical data and who has access and how often it is used. Critical data is kept, and governance is established. This will help focus your data initiatives around business benefits and set guidelines around what is considered business critical.
Define collaboration and responsibility	Different departments have a stake in data and different requirements. Establish a collaborative culture between teams. A chief data or digital officer helps transform the business needs into clearly defined data management and analytics processes.

Culture shift: KPI and goal-driven organization design



Unify
leaders and organization around the vision

Initiate
the data analytics process

Optimize
operating models and processes

Embrace
new approaches to data and technology

Redefine
decision-making with data analytics

Get leadership buy-in around data-driven transformation and culture

Focus on quick wins to highlight the value and potential of a data-driven approach

Optimize processes and operating models to improve results

Empower stakeholders to solve business problems with data

Improve decision-making and maximize returns from data analytics

data transformation journey

Leadership buy-in

Quick wins to showcase success

Change accelerates

Stakeholder engagement continues to rise

New data culture created

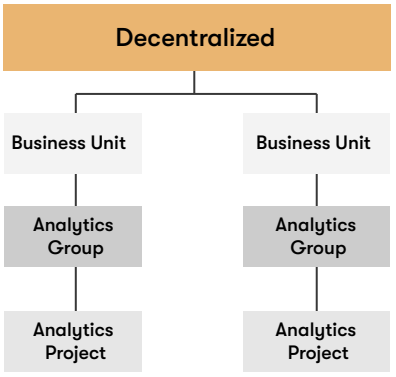
Obstacles to overcome	Data-driven organization
Primarily a cultural issue. Organizations underestimate the need for, and scope of, the cultural shift.	Change management is not done on an ad-hoc basis, but in a holistic, strategic, and thoughtful manner to ensure cultural change occurs.
Lack of vision and missing the right sponsorship lead to political rifts.	High C-level public commitment.
Lack of commitment to test and learn.	Fostering a safe environment for experimentation is critical to cultural change.
Not enough stakeholder engagement.	Empowering decisions at lower levels in the organization infuses cultural change.

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Structure, skill sets: Operating model for a data-driven organization

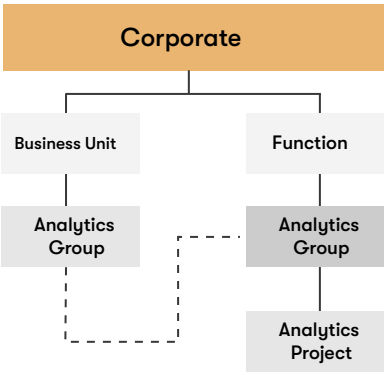
TRADITIONAL ORGANIZATION STRUCTURES

Decentralized



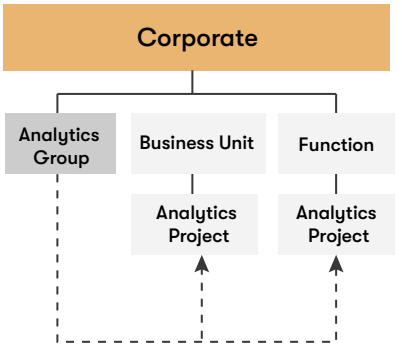
- Least coordinated option
- Analytics used sporadically across the organization
- Resources within each group's funtions
- Leads to silos, lack of analytics standardization, and decentralized reporting

Funtional



- Analytics specialists work in one dept where analytics is most relevant: i.e. Marketing or supply chain
- Entails little to no coordination and expertise, isn't used strategically enterprise-wide

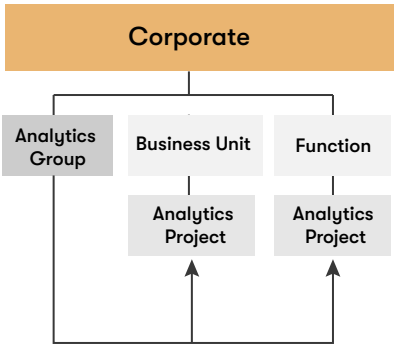
Consulting



- Analytic folks work together as one group
- Their role within an organization is consulting
- Depts can "hire" them for specific tasks
- No resource allocation - either specialists are available or not

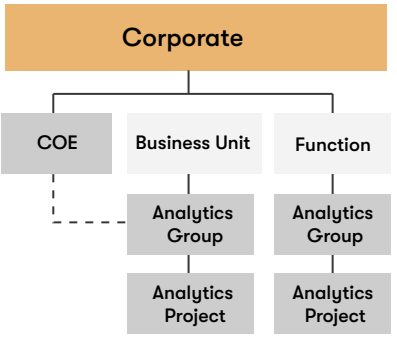
DATA-DRIVEN ORGANIZATION STRUCTURES

Centralized



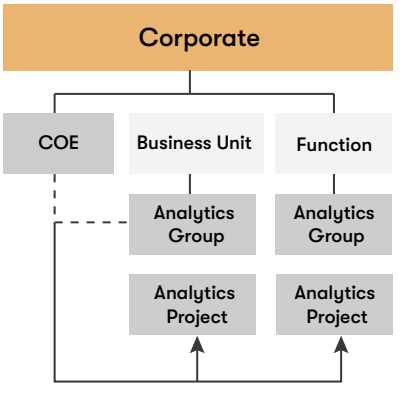
- Organization uses analytics in strategic tasks
- One data science team serves the whole organization in a variety of projects
- Provides team with long-term funding and resource management

Center of Excellence



- Keep the centralized team, but data scientists are allocated to units in the organization
- Balanced structure - analytics activities are highly coordinated, with experts placed in the business units

Federated



- This model is relevant when there's a high demand for analytics talent across the company
- Employ a SWAT team comprised of a central analytics group that addresses complex cross-functional tasks
- The rest of the data scientists are distributed as in the Center of Excellence model

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Stages: Maturity model in creating a data-driven organization

1. Siloed organization

- A lot of resources are used to generate and consolidate information
- No clear and consistent picture of the organization
- Temporary ad-hoc solutions, spreadsheets
- Bad quality and fragmented data

2. Data-aware organization

- People understand the value of high-quality information for the business
- Process-specific solutions and manually gathered information
- Interactive reporting systems, local data marts
- Duplicate data, not very up to date

3. Data-driven organization

- C-level sponsorship for a data-driven culture and organization
- Operations are driven by information and facts: guidance from KPIs, strategy monitoring, and communication
- Centralized data warehouse, management dashboards, business intelligence tools
- Good quality, trusted, and governed internal data; common business vocabulary

4. Analytical organization

- Centralized analytics organization in place that drives the experimental culture, coordinates data strategy and activities
- Analytics used to improve decision-making, internal processes, and customer experience
- Common data platforms, multiple components, advanced analytics, machine learning
- Multi-structural internal and external data, collected in real-time; different and diverse data sources

5. Data monetization organization

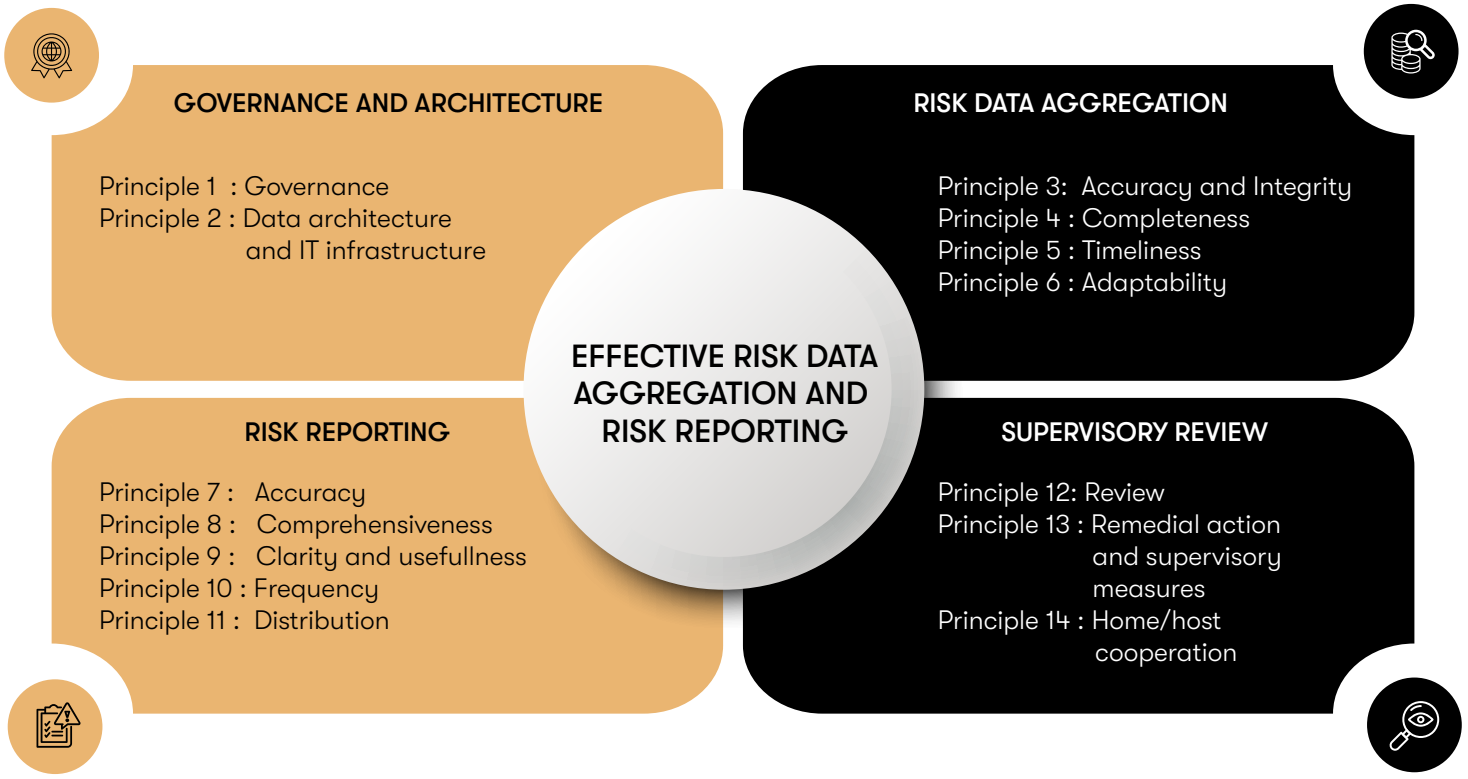
- Analytical culture spread across the organization to different functions, processes, and entities
- New business models, products, and services developed based on data and analytics
- Interfaces for different application needs, real-time reporting, analytics, and AI used effectively
- Fully integrated inter organization-wide data

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Data lineage: Ethics, compliance, and risk in a data-driven world

Financial service companies face tough challenges operating in today's digital space which has stringent compliance regulations. Enterprises that are concerned with sensitive data or looking to unlock the potential of big data can visualize data flows through the use of data lineage.

A data lineage report uses the metadata repository to create the entire data flow. The data lineage report depicts the visual map of the data flow that helps quickly determine the origin of data.



Principles of Effective Risk Data Aggregation and Risk Reporting



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How does data lineage work?	To reap the benefits of using big data lineage to demonstrate reporting accuracy, enterprises should conduct a full discovery of interconnections, data sources, and processing systems and create a metadata repository for all the data attributes required to describe the data flow from origin to destination.	Data attributes stored in the metadata repository include: ▪ Users, processes, and systems involved in the data flow, and their dependencies ▪ Business rules, terms, procedures, and scripts used for data processing ▪ Data types, database, and table names ▪ Reporting systems ▪ Timestamps when each time data is created, changed, processed, and deleted ▪ Location of data, owner, steward, format, and retention policies
Business benefits	The amount of data needed to gain a competitive advantage will rise on par with the regulations necessary to ensure that enterprises compete in an ethical and responsible manner. The combination of large data volume and more stringent statutory regulations is sufficient to implement effective data governance practices, including data lineage.	Enterprises that leverage the methodology as part of their data governance program reap the following benefits: ▪ Accurate metrics and reports ▪ Identifying redundant data or processes ▪ Increased efficiency in regulatory reporting ▪ Improved decision-making and data analysis ▪ Uninterrupted improvement of data governance ▪ Business rules discrepancies identification ▪ Ability to identify security breaches or exposure to sensitive data ▪ Enhanced data and systems architecture ▪ An improved new system and change management ▪ Implementation by understanding the positive impacts on data flows

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6 steps to becoming a **data-driven organization**

In the fast-paced global economy, companies must become data-driven organizations in order to remain competitive. Businesses that use big data see 8-10% increase in profit.[6] We have explored steps that enterprises can take to create a truly data-driven business.

1. Create a sense of urgency

C-level executives need to create a sense of urgency and promote opportunities that will stem from leveraging a data-driven culture.

2. Get everyone on board

The key factor in becoming data-driven is having the right leadership team to create a culture that places data and analytics at the heart of the enterprise.

3. Develop a data-driven vision and strategy

A data-driven vision creates a platform that helps the enterprise work toward a common goal and develop a strategy. The right strategy that uses a phased approach, with interim goals and milestones defined, can help increase agility and encourage more leaders to join the coalition.

4. Stay prepared to tackle obstacles

An enterprise must ensure that the right processes are in place to allow users to apply data and analytics to solve business problems. This step also involves giving the enterprise the right self-service data preparation tools that allow the IT team to maintain governance and security over the data.

5. Look for a short-term investment and win

An organization can identify short-term projects that can be executed without much initial investment and staffing procedures. These short-term projects allow project managers to easily define goals that can help maintain momentum and foster a sense of accomplishment.

6. Keep looking ahead in the journey

Develop a long-term roadmap to scale up the organization, scope, and investments based on early short-term projects' success and aligned with the overall corporate strategy.



How Photon helps **Fortune 500 companies leverage data**

Photon has rich experience working with Fortune 500 companies to implement robust big data and analytics strategies and achieve key business goals. Below are instances wherein Photon helped global companies drive a winning data strategy with the right combination of capabilities and technologies.



Client: A Fortune 100 drugstore chain

Requirement: The company wanted to conceptualize and build a next-generation platform to provide data-driven offers. They wanted to use their customer data to deliver personalized coupons and promotions and make them redeemable online/offline.

Photon's involvement: Photon built this platform as an engine that caters to future needs around personalization. A part of this engagement was building the management portal to allow the business to dictate and analyze models for 1-1 personalization. The scope of the solution included: core platform components, data ingestion, offer management portal, machine learning tools, and consumption APIs for digital wallets and POS.



Client: A Fortune 500 CPG manufacturer

Requirement: The company wanted to develop a single consumer data hub that will allow them to know 100% of the customers and be able to identify them across their brands and communication channels.

Photon's involvement: Photon was involved in creating the big data blueprint and recommendations from a technology platform, choice of technologies, and for the on-boarding of brands onto the platform. Part of the program was to integrate a standardized set of reference apps for eMarketing and eCommerce (mobile and online) into the next-generation platform on an AWS Cloud.

"Combining data and analytics helps unlock the intelligence that enables enterprises to segment their customers; get a 360-degree view of customer behavior, needs, and preferences; and personalize experiences to increase customer satisfaction and retention."



Muhamad Daud
SVP, Engineering & Head, Photon Labs

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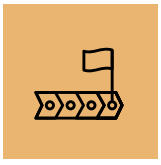
Photon's roadmap to becoming a **data-driven organization**

Photon has an approach that has been enabling Fortune 500 players across industries to transform into data-focused enterprises and thereby derive more value from their data. This approach follows the steps as discussed below.



Assessment and roadmap definition

Establish the overall vision and define the problem statement. Define the overall business domain priority and rollout plan. Perform gap assessment for the business domain with respect to the problem statement. Define the technical blueprint and the program plan. Define a centralized data governance and analytics team and change management processes. Deliver ROI and business justification of the overall program.



Typical one-time implementation

Define the minimum viable product (MVP) release for the identified business domain. Establish implementation of technical architecture. Embrace an agile sprint methodology complete with a POC, technical framework sprint, data ingestion/quality methodology, and testing/deployment framework. Establish a core team with the right skill sets.



Organizational rollout

Carry out the business domain rollout by identifying macro use cases and enabling standardization to leverage learnings and release common functionality across business functions. Drive the buildout of talent and capability and enable data-driven decision-making.

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Transform your organization into a **data-driven powerhouse**

Big data and analytics are critical for a wide range of digital business transformation goals—from improving real-time marketing effectiveness with hyper-personalized experiences to generating new revenue streams. Analytics continues to change how enterprises make decisions by delivering actionable business insights at an increasingly granular level. Creating competencies in big data and advanced analytics has, therefore, become a strategic business imperative for any digitally-driven enterprise.

At Photon, we work at the intersection of people, process, and technology—helping our clients derive greater value from data analytics strategies. **Connect with Photon** today and build a data-driven organization to optimize business processes, improve decision-making, and deliver richer consumer experiences.

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